# 1-2

## Study Guide

## Order of Operations

Read this sentence: *Jason said Leona is smart.* You need punctuation to tell you whether the sentence means *Jason said, "Leona is smart."* or *"Jason," said Leona, "is smart."*

The meaning of a mathematical expression such as $20 - 2 \times 3$ can also be confusing unless you know which numbers and operations should be grouped together. The order of operations at the right tells you that $20 - 2 \times 3$ means $20 - (2 \times 3)$ or $14$.

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**Order of Operations**

1. Find the values of the expressions inside grouping symbols, such as parentheses () and brackets [], and as indicated by fraction bars.
2. Do all multiplications and divisions from left to right.
3. Do all additions and subtractions from left to right.

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**Example 1:** Find the value of $16 \div 8 \times 5$.

$16 \div 8 \times 5 = 2 \times 5$      *Multiply and divide from left to right.*
$= 10$

**Example 2:** Find the value of $7(10 - 3)$.

$7(10 - 3) = 7 \times 7$      *Simplify within parentheses first.*
$= 49$

**Example 3:** Find the value of $\dfrac{10 - (2 \times 3)}{5 \div 5}$.

$\dfrac{10 - (2 \times 3)}{5 \div 5} = \dfrac{10 - 6}{5 \div 5}$      *Simplify within parentheses first.*

$= \dfrac{4}{1}$      *Evaluate the numerator and the denominator separately.*

$= 4$

**Find the value of each expression.**

1. $3 + 4 - 2$

2. $6 + 3 \times 7$

3. $1 + 15 \div 5 \times 7$

4. $(7 + 6) \times 5$

5. $2 + 8 \times 3 - 1$

6. $\dfrac{7 + 1}{2}$

7. $(2 + 8) \times 3 - 1$

8. $\dfrac{12 + 6}{12 - 6}$

9. $\dfrac{5 \times 4}{4 + 6}$

10. $5 \times (11 - 7)$

11. $\dfrac{7 - 5}{10 + 5}$

12. $\dfrac{1 + 5}{2 \times 9}$

## Order of Operations

*Find the value of each expression.*

1. $16 \div 4 - 3$

2. $6 + 9 \cdot 2$

3. $3(8 - 4) \div 2$

4. $6 \cdot 2 \div 3 + 1$

5. $21 \div [7(12 - 9)]$

6. $\frac{7 + 5}{3 \cdot 2}$

*Name the property of equality shown by each statement.*

7. $4 + d = 4 + d$

8. If $\frac{y}{3} = 9$ and $y = 27$, then $\frac{27}{3} = 9$.

9. If $3c + 1 = 7$, then $7 = 3c + 1$.

10. If $8 - n = 3 + 1$ and $3 + 1 = 2 \cdot 2$, then $8 - n = 2 \cdot 2$.

*Find the value of each expression. Identify the property used in each step.*

11. $6(9 - 27 \div 3)$

12. $4(16 \div 16) + 3$

13. $5 + (3 - 6 \div 2)$

14. $8 \div 2 \cdot 7(9 - 8)$

*Evaluate each algebraic expression if s = 5 and t = 3.*

15. $3(2s - t)$

16. $\frac{4s}{t - 1}$

17. $s + 3t - 8$

18. $s - \frac{t}{3} \cdot 5$

19. $(s + t) - 2 \cdot 3$

20. $3s - 4t + 2$